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This Quick Start was created by Onica, Inc. in collaboration with Amazon Web Services (AWS).

**Quick Starts** are automated reference deployments that use AWS CloudFormation templates to deploy key technologies on AWS, following AWS best practices.

### Quick Links

The links in this section are for your convenience. Before you launch the Quick Start, please review the architecture, security, and other considerations discussed in this guide.

- If you have an AWS account, and you’re already familiar with AWS services and the AWS Internet of Things (IoT) Camera Connector, you can launch the Quick Start to build the serverless architecture shown in Figure 1. The deployment takes approximately five minutes. If you’re new to AWS or to the AWS IoT Camera Connector Quick Start, please review the implementation details and follow the step-by-step instructions provided later in this guide.

  ![Launch button](Launch.png)

- If you want to take a look under the covers, you can view the AWS CloudFormation template that automates the deployment.

  ![View template button](View template.png)
Overview

This Quick Start reference deployment guide provides step-by-step instructions for deploying the AWS IoT Camera Connector on the AWS Cloud.

This Quick Start is for users who intend to stream output of connected cameras to Amazon Kinesis Video Streams in their AWS account.

AWS IoT Camera Connector on AWS

AWS IoT enables internet-connected devices to connect to the AWS Cloud and lets applications in the AWS Cloud interact with these devices. Common IoT applications either collect and process telemetry from devices or enable users to control a device remotely.

You can use the AWS IoT Camera Connector Quick Start template and Config App App—included in the Quick Start—to provision supported cameras and stream camera output to Kinesis Video Streams in your AWS account.

The Quick Start template creates resources in your AWS account to provision cameras as IoT things and to create an associated Kinesis video stream.

The Config App helps you discover cameras on your local network. It also provides IoT certificates and other information necessary for the camera to stream video content to Kinesis Video Streams.

Together, the Config App and the AWS IoT Camera Connector Quick Start enable you to rapidly discover, provision, connect, and manage cameras (available through select partners) and their streaming video content through your AWS account.

In 5 minutes or less, you can connect up to thousands of cameras and begin implementing streaming video analytics solutions.

Costs and Licenses

You are responsible for the cost of the AWS services used while running this Quick Start reference deployment. There is no additional cost for using the Quick Start.

The AWS CloudFormation template for this Quick Start includes configuration parameters that you can customize. For cost estimates, see the pricing pages for each AWS service you will be using. Prices are subject to change.
Tip  After you deploy the Quick Start, we recommend that you enable the AWS Cost and Usage Report to track costs associated with the Quick Start. This report delivers billing metrics to an S3 bucket in your account. It provides cost estimates based on usage throughout each month, and finalizes the data at the end of the month. For more information about the report, see the AWS documentation.

Architecture

Deploying this Quick Start for a serverless architecture with default parameters builds the following AWS IoT Camera Connector environment in the AWS Cloud.

The Quick Start sets up the following serverless architecture:

- An AWS IoT policy to associate with connected cameras.
- An AWS Identity and Access Management (IAM) role for connected cameras to stream to Kinesis Video Streams.
• An Amazon DynamoDB table to store provisioning keys to be provided to the camera installer. Once provisioning is complete, you should remove the keys.

• AWS Lambda functions to create a provisioning key and a role alias, verify stack, and provision a camera.

• Amazon API Gateway to expose provisioning endpoints through HTTPS.

• Amazon CloudWatch alarms to expose camera streaming status through an Amazon Simple Notification Service (Amazon SNS) topic, and update the associated shadow (which stores and retrieves status information) of the camera’s IoT thing.

• A separate Config App installable for provisioning cameras on the local network to stream to your AWS account.

Prerequisites
Technical Requirements
From a technical standpoint, you’ll need:

• At least one camera from a supported vendor. For a list of supported vendors, camera models, and camera reference designs, see Appendix A: Camera Partners.

• An AWS account. If you don’t already have an AWS account, create one at https://aws.amazon.com by following the on-screen instructions.

• The ability to launch AWS CloudFormation templates that create IAM roles.

• A Windows, Mac, or Linux machine on the same network as your supported cameras.

Specialized Knowledge
Before you deploy this Quick Start, we recommend that you become familiar with the following AWS services. (If you are new to AWS, see Getting Started with AWS.)

• Amazon Kinesis Video Streams
• AWS IoT Core
• Amazon DynamoDB
• AWS Lambda
• AWS CloudFormation

Deployment Options
This Quick Start provides one deployment option:
- **Deploy AWS IoT Camera Connector as serverless architecture** (end-to-end deployment). This deployment builds a new AWS environment consisting of the infrastructure resources required to provision cameras to your AWS account.

The Quick Start provides a template for this option. You can also configure AWS IoT Camera Connector settings, as discussed in **Step 4, Provision Cameras**, later in this guide.

**Deployment Steps**

**Step 1. Prepare Your AWS Account**

1. If you don’t already have an AWS account, create one at [https://aws.amazon.com](https://aws.amazon.com) by following the on-screen instructions.

2. Use the region selector in the navigation bar to choose the AWS Region where you want to deploy AWS IoT Camera Connector on AWS.

**Step 2. Launch the Quick Start**

**Note** You are responsible for the cost of the AWS services used while running this Quick Start reference deployment. There is no additional cost for using this Quick Start. For full details, see the pricing pages for each AWS service you will be using in this Quick Start. Prices are subject to change.

1. Launch the AWS CloudFormation template into your AWS account.

   ![Launch Button](image)

   Each deployment takes about 5 minutes to complete.

2. Check the region that’s displayed in the upper-right corner of the navigation bar, and change it if necessary. This is where the infrastructure for AWS IoT Camera Connector will be built. The template is launched in the US East (Ohio) Region by default.

3. On the **Select Template** page, keep the default setting for the template URL, and then choose **Next**.

4. On the **Specify Details** page, change the stack name if needed. Review the parameters for the template. Provide values for the parameters that require input. For all other
parameters, review the default settings and customize them as necessary. When you finish reviewing and customizing the parameters, choose Next.
In the following tables, parameters are listed by category:

**View template**

**Provisioning Configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create Provisioning Key (CreateProvisioningKey)</td>
<td>true</td>
<td>Indicates whether to automatically create a provisioning key when launching the stack.</td>
</tr>
</tbody>
</table>

**AWS Quick Start Configuration:**

<table>
<thead>
<tr>
<th>Parameter label (name)</th>
<th>Default</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick Start S3 Bucket Name (QSS3BucketName)</td>
<td>aws-quickstart</td>
<td>The S3 bucket you have created for your copy of Quick Start assets, if you decide to customize or extend the Quick Start for your own use. The bucket name can include numbers, lowercase letters, uppercase letters, and hyphens (-), but should not start or end with a hyphen.</td>
</tr>
<tr>
<td>Quick Start S3 Key Prefix (QSS3KeyPrefix)</td>
<td>quickstart-onica-connected-camera/</td>
<td>The S3 key name prefix used to simulate a folder for your copy of Quick Start assets, if you decide to customize or extend the Quick Start for your own use. This prefix can include numbers, lowercase letters, uppercase letters, hyphens (-), and forward slashes (/). The prefix can’t start or end with a forward slash (/) because this is automatically appended.</td>
</tr>
</tbody>
</table>

5. On the **Options** page, you can **specify tags** (key-value pairs) for resources in your stack and **set advanced options**. When you’re done, choose **Next**.

6. On the **Review** page, review and confirm the template settings. Under **Capabilities**, select the check box to acknowledge that the template will create IAM resources.

7. Choose **Create** to deploy the stack.

8. Monitor the status of the stack. When the status is **CREATE_COMPLETE**, the AWS IoT Camera Connector stack is ready.

9. Note the StackEndpoint and ProvisioningKey displayed in the **Outputs** tab for the stack, as shown in Figure 2. You will use these to configure your AWS account in the Config App, as explained in **Step 4. Provision Cameras**.
Step 3. Download the Config App for the AWS IoT Camera Connector

This Quick Start works in conjunction with the Config App to provision cameras. The application is available for Windows, Mac, and Linux platforms.

To get started with the Config App:

1. Download and launch the appropriate config-app file for your platform:
   - **Microsoft Windows**: Download and run the .exe file.
   - **Mac**: Download and run the .dmg file. Drag the config-app file to Applications as prompted. Open Launchpad and choose config-app application.
   - **Linux**: Download the .AppImage file. Make it executable, and then run it.

2. Once the Config App is running, you’ll provision the cameras by using the StackEndpoint and ProvisioningKey stack outputs from the provisioning stack of the AWS IoT Camera Connector Quick Start.

Step 4. Provision Cameras

Provision your cameras with the following steps in the Config App:

1. Copy the StackEndpoint and ProvisioningKey stack outputs into the **Stack Endpoint** and **Provisioning Key** fields in the Config App, and then choose **Save**, as shown in Figure 3.
Figure 3: Entering the stack endpoint and provisioning key

2. Once the endpoint is configured, you can use the Config App to discover cameras. Choose **Discover Cameras**, as shown in Figure 4.

Figure 4: Enabling camera discovery

After a few seconds, you’ll see a list of discovered cameras, as shown in Figure 5.
Figure 5: List of discovered cameras

a. If cameras aren’t discovered automatically, manually enter an IP address, unique ID, and name, as shown in Figure 6.

Figure 6: Manually adding a camera
b. Select all cameras you want to provision, and choose the scheme supported by the camera provisioning API (http or https), as shown in Figure 7.

![Figure 7: Choosing the schema for the camera provisioning API](image)

3. Enter the user name and password for the camera provisioning API, if required by the camera vendor, and then choose **Provision Selected Cameras**, as shown in Figure 8.

![Figure 8: Entering credentials for the camera provisioning API](image)
The Config App coordinates with the provisioning stack and camera APIs to provide certificates and other information for the camera to stream to the configured AWS account. The status indicates that the camera has been successfully provisioned, as shown in Figure 9.

![Figure 9: Successfully provisioned camera](image)

**Step 5. Verify the Streaming Capabilities of the Camera Output**

View the Kinesis video stream for the provisioned cameras in the AWS account ([https://console.aws.amazon.com/kinesisvideo/streams](https://console.aws.amazon.com/kinesisvideo/streams)), and remove the Provisioning Key from the DynamoDB table.

**Best Practices Using AWS IoT Camera Connector on AWS**

Launch the provisioning stack in the AWS Region closest to your installation for the best streaming video performance.

The camera installer can use the provisioning key for multiple cameras. After you’ve provisioned the desired cameras to your AWS account, remove the Provisioning Key from the DynamoDB table to disable provisioning of additional devices.
Troubleshooting

**Q.** I encountered a CREATE_FAILED error when I launched the Quick Start.

**A.** If AWS CloudFormation fails to create the stack, we recommend that you relaunch the template with **Rollback on failure** set to No. (This setting is under **Advanced** in the AWS CloudFormation console, **Options** page.) With this setting, the stack’s state will be retained and the instance will be left running, so you can troubleshoot the issue. (Look at the log files in `%ProgramFiles%\Amazon\EC2ConfigService` and `C:\cfn\log`.)

<table>
<thead>
<tr>
<th>Important</th>
<th>When you set <strong>Rollback on failure</strong> to No, you will continue to incur AWS charges for this stack. Please make sure to delete the stack when you finish troubleshooting.</th>
</tr>
</thead>
</table>

For additional information, see [Troubleshooting AWS CloudFormation](https://aws.amazon.com/documentation/cfn) on the AWS website.

**Q.** I encountered a size limitation error when I deployed the AWS CloudFormation template.

**A.** We recommend that you launch the Quick Start template from the links in this guide or from another S3 bucket. If you deploy the template from a local copy on your computer or from a non-S3 location, you might encounter template size limitations when you create the stack. For more information about AWS CloudFormation limits, see the [AWS documentation](https://aws.amazon.com/documentation/cfn).

**GitHub Repository**

You can visit our [GitHub repository](https://github.com) to download the templates and scripts for this Quick Start, to post your comments, and to share your customizations with others.

**Additional Resources**

**AWS services**

- Amazon Kinesis Video Streams
  [https://aws.amazon.com/documentation/kinesis/](https://aws.amazon.com/documentation/kinesis/)
- AWS IoT Core
  [https://aws.amazon.com/documentation/iot/](https://aws.amazon.com/documentation/iot/)
- Amazon DynamoDB
  [https://aws.amazon.com/documentation/dynamodb/](https://aws.amazon.com/documentation/dynamodb/)
• AWS Lambda
  https://docs.aws.amazon.com/lambda/

• AWS CloudFormation
  https://docs.aws.amazon.com/cloudformation/

Quick Start reference deployments
• AWS Quick Start home page
  https://aws.amazon.com/quickstart/

Document Revisions

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<th>Date</th>
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<th>In sections</th>
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<tbody>
<tr>
<td>November 2018</td>
<td>Initial publication</td>
<td>—</td>
</tr>
</tbody>
</table>
Appendix A: Camera Partners

Camera OEM (Original Equipment Manufacturer) Supported Models

- **Hikvision**: As of 11/16/2018 - All Hikvision Value Series Cameras including the 2xx3 Value and 2xx5 Performance Series Hikvision IP Cameras

- **Dahua Technology**: As of 11/16/2018 – All Dahua Technology Ultra-Series IP Cameras

- **Acer**: As of 11/16/2018 – Acer aiSage Cameras

- **Vivotek**: As of 11/16/2018
  - Multi-sensor camera: MS9390-HV
  - Speed dome camera: SD9161-H, SD9361-EHL, SD9362-EH, SD9362-EHL, SD9363-EHL, SD9363-EHL-v2, SD9364-EH, SD9364-EHL, SD9364-EHL-v2, SD9365-EHL, SD9366-EH, SD9366-EHL
  - Zoom lens camera: IZ9361-EH

Camera ODM (Original Design Manufacturer) Supported Reference Designs

- **Altek**: As of 11/16/2018 - IPC 603 Industrial Security Reference Design

- **Sercomm**: As of 11/16/2018
  - Sercomm RC8522 WiFi IP Camera
  - Sercomm OC452 Full HD POE Outdoor Camera
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Notices

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